HANDLING DIFFERENT TYPES OF RSRQ MEASUREMENTS BASED ON OFFSETS

FIELD

[0001] The subject matter described herein relates to wireless communications.

BACKGROUND

[0002] Robust mobility management may enable offloading and other actions based on mobility measurements. Some of these mobility measurements may include reference signal received quality (RSRQ) for radio resource management as well as other mobility measurements. In the case of RSRQ, it is generally defined as the reference symbol received power (RSRP) divided by received signal strength indicator (RSSI). Table 1 below depicts an example definition of RSRQ in accordance with 3GPP TS 36.214.

TABLE 1

Definition	Reference Signal Received Quality (RSRQ) is defined as the ratio N × RSRP/(E-UTRA carrier RSSI), where N is the number of RB's of the E-UTRA carrier RSSI measurement bandwidth. The measurements in the numerator and denominator shall be made over the same set of resource blocks. E-UTRA Carrier Received Signal Strength Indicator (RSSI), comprises the linear average of the total received power (in [W]) observed only in OFDM symbols containing reference symbols for antenna port 0, in the measurement bandwidth, over N number of resource blocks by the UE from all sources, including co-channel serving and non-serving cells, adjacent channel interference, thermal noise etc. If higher-layer signalling indicates certain subframes for performing RSRQ measurements, then RSSI is measured over all OFDM symbols in the indicated subframes. The reference point for the RSRQ shall be the antenna connector of the UE. If receiver diversity is in use by the UE, the reported value shall not be lower than the corresponding RSRQ of any of the individual diversity branches.
Applicable for	RRC_IDLE intra-frequency, RRC_IDLE inter-frequency, RRC_CONNECTED intra-frequency, RRC_CONNECTED inter-frequency

[0003] There are currently two different types of RSRQ metrics being used in E-UTRAN. The first kind of RSRQ metric ("old RSRQ") is defined, so that the UE measures the RSSI from symbols only in which the Common Reference Symbols (CRS) are present. The second kind of RSRQ metric ("new RSRQ") is defined for the case of, for example, enhanced Inter-cell interference coordination (eICIC). In this second type of RSRQ, it specifies that the RSSI be measured from all of the symbols of a subframe.

SUMMARY

[0004] Methods and apparatus, including computer program products, are provided for different measurement types.

[0005] In some example embodiments, there is provided a method. The method may include receiving, at a user equipment, measurement configuration information including at least one value for a first type of reference signal received quality measurement; detecting, at the user equipment, whether an offset is received from the network; adjusting the at least one value in accordance with the detected offset to enable a second type of reference signal received quality measurement at the user equipment; and activating the second type of reference signal received quality measurement configured with the adjusted at least one value.

[0006] In some example embodiments, there is provided a method, which may include sending, by a base station, measurement configuration information including at least one value for a first type of reference signal received quality measurement; and sending, by the base station, an offset to signal a user equipment to use a second type of reference signal received quality measurement at the user equipment.

[0007] In some variations, one or more of the features disclosed herein including the following features can optionally be included in any feasible combination. The first type of reference signal received quality may be determined based on a reference symbol received power divided by a received signal strength indicator, wherein the received signal strength indicator is measured from symbols only in which common reference symbols are present. The second type of reference signal received quality may be determined based on a reference symbol received power divided by a received signal strength indicator, wherein the received signal strength indicator is measured from all of the symbols of a subframe. The adjusting may be specific to one or more cells. The adjusting may be specific to one or more carriers. The adjusting may be specific to one or more measurement events. When the offset is detected, the user equipment may determine that the second type of reference signal received quality measurement is to be activated at the user equipment. The detecting may further comprises detecting an indicator representative the second type of reference signal received quality measurement being activated at the user equipment. When the user equipment does not receive at least one of the indicator or the offset, the user equipment may enable the first type of reference signal received quality measurement. The method may further include receiving at least one of the indicator or the offset via at least one of a broadcast, a system information block, radio resource control signaling, or dedicated signaling and measuring, at the user equipment, a difference between the first type of reference signal received quality measurement and the second type of reference signal received quality measurement.

[0008] The above-noted aspects and features may be implemented in systems, apparatus, methods, and/or articles depending on the desired configuration. The details of one or more variations of the subject matter described herein are set forth in the accompanying drawings and the description below. Features and advantages of the subject matter described herein will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

[0009] In the drawings,

[0010] FIG. **1** depict an example of a system for handling different types of RSRQ measurements, in accordance with some exemplary embodiments;

[0011] FIG. **2** depict an example of a process for handling different types of RSRQ measurements, in accordance with some exemplary embodiments;

[0012] FIG. **3** depicts an example of a user equipment, in accordance with some exemplary embodiments; and

[0013] FIG. **4** depicts an example of a network node, such as a base station, in accordance with some exemplary embodiments.